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ASSIGNMENT BOOKLET

SCN2231 Biology 30
Module 7 Assignment

FOR STUDENT USE ONLY

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Teacher

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- Has your work been reread to ensure accuracy in spelling and details?
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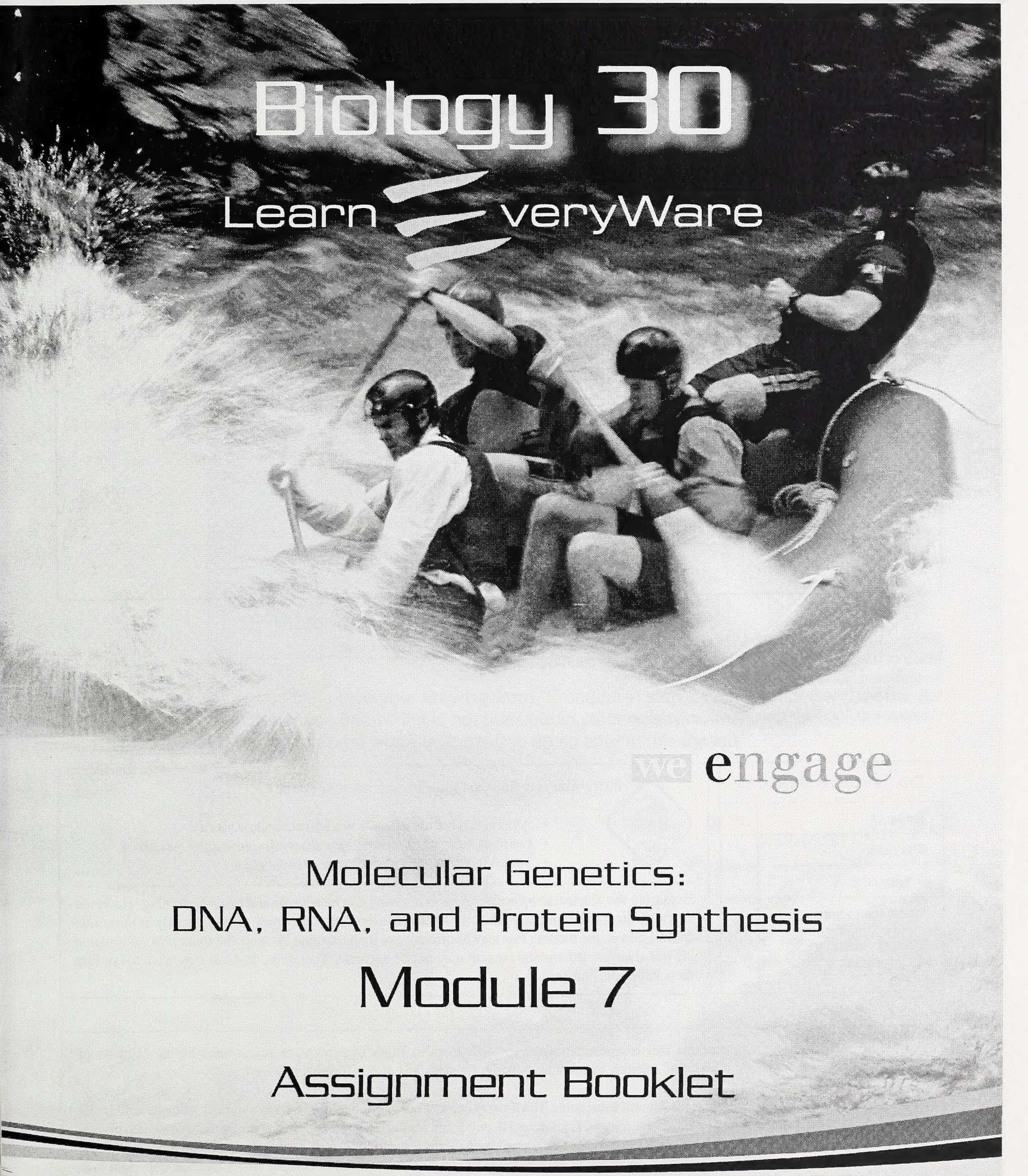
Biology 30

Learn EveryWare



we engage

Molecular Genetics: DNA, RNA, and Protein Synthesis

Module 7

Assignment Booklet

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Summary

	Total Possible Marks	Your Mark
Lesson 1 Assignment	10	
Lesson 2 Assignment	15	
Lesson 3 Assignment	24	
Lesson 4 Assignment	13	
Lesson 5 Assignment	44	
Lesson 6 Assignment	15	
	121	

Teacher's Comments

Biology 30 Learn EveryWare
Module 7: Molecular Genetics: DNA, RNA, and Protein Synthesis
Assignment Booklet
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Students	✓
Teachers	✓
Administrators	
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General Public	
Other	

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MODULE 7: LESSON 1 ASSIGNMENT

This Module 7: Lesson 1 Assignment is worth 10 marks. The value of each assignment and each question is stated in the left margin.

(10 marks) Lesson 1 Assignment: DNA Structure

DNA Deductions Assignment

Complete "Thought Lab 18.1: DNA Deductions" on page 629 of the textbook. Follow the "Procedure" and complete the "Analysis" questions for this activity.

(3 marks) 1. Place your completed table from Step 1 of the procedure in the space below.

Nucleotide	Presence in DNA sample (percent)

(4 marks) 2. If possible, place your drawing from "Procedure" step 2 (scanned or done digitally) in the space below. If it is not possible to place your drawing below, submit it with this assignment when instructed to do so later in this lesson.

(3 marks) 3. Answer “Analysis” questions 1 to 3.

1. ______________________________

2. ______________________________

3. ______________________________

MODULE 7: LESSON 2 ASSIGNMENT

This Module 7: Lesson 2 Assignment is worth 15 marks. The value of each assignment and each question is stated in the left margin.

(15 marks) Lesson 2 Assignment: DNA Replication

(10 marks) 1. Describe the steps involved in DNA replication by using one of the following methods:

a. Create a flow chart to summarize the steps.

OR

b. Create a story to help a Grade 4 student understand these steps.

OR

c. Prepare a multimedia presentation using images.

(3 marks) 2. Use a Venn diagram or other chart to compare and contrast DNA and RNA structure. Place your diagram in the space provided.

(2 marks) 3. Use a diagram to explain what is meant by semi-conservative replication. Place your diagram in the space provided.

MODULE 7: LESSON 3 ASSIGNMENT

This Module 7: Lesson 3 Assignment is worth 24 marks. The value of each assignment and each question is stated in the left margin.

(24 marks)

Lesson 3 Assignment: Protein Synthesis

Part 1: RNA and Protein Synthesis Simulation

(2 marks) 1. How did the strand of mRNA you made compare to the left side (the anti-sense strand) of the unzipped DNA strand? What was the same? What was different?

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(1 mark) 2. The UAC anticodon is the initiator. What amino acid is anticodon always attached to?

____

(2 marks) 3. Describe what happens when you add the third tRNA anticodon to the mRNA strand.

4. The original sense strand of DNA had the following nucleotide sequence:

TACCCCGCGAAATATTTCCTAATT

(2 marks) a. What is the nucleotide sequence of the mRNA transcribed from this DNA template?

(2 marks) b. What is the amino acid sequence of the polypeptide that is produced from the mRNA strand?

Part 2: Transcription in Reverse

(15 marks) 1. In this activity you will work backward from an amino acid sequence toward the original DNA sense strand. Follow the procedure for "Thought Lab 18.2: Transcription in Reverse" on page 639 of the textbook.

Complete "Procedure" questions 1 and 2. Place your answers in the space provided. **(5 marks)**

Complete "Analysis" questions 1 and 2. Post your answer to "Analysis" question 2 on the discussion board and view other students' ideas. Revise your work in the space provided. **(5 marks each = 10 marks)**

Procedure Question 1:

Analysis Question 1:

Analysis Question 2:

MODULE 7: LESSON 4 ASSIGNMENT

This Module 7: Lesson 4 Assignment is worth 13 marks. The value of each assignment and each question is stated in the left margin.

(13 marks)

Lesson 4 Assignment: Changes in the Genetic Code

Causes of Mutations

(3 marks)

Part 1

Of the 72 700 Canadians who died from cancer in 2007, 19 900 died from lung cancer, the most preventable of all cancers. Examine the graphs in the "Thought Lab 18.3: Investigating Cancer Genes" on page 646. Place your answer to "Analysis" question 1 in the space provided.

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(5 marks x 2 = 10 marks)

Part 2

Choose one other mutagen (physical or chemical), unrelated to smoking, to research in detail. (Have the mutagen approved by your teacher before you proceed). Summarize your research on a Wiki page, in a class discussion area, or in a presentation area so that other students can access your research summaries. Also, place your summary in the space provided.

You may work individually or in groups. Insert any pictures or visual effects to make this summary appealing to the reader. The summary will be marked by your instructor using the rubric immediately following the space provided for your answer. Answer the following questions about the mutagen in your summary.

- Where is the mutagen found?
- Are there any positive uses for this mutagen?
- How does the mutagen cause the change in DNA?

- What effect can the mutagen eventually cause?
- How can contact with the mutagen be prevented? Do any human activities cause an increase in contact with the mutagen?
- Are there any stats associated with the mutagen that you came across during your searches?
- Insert any pictures or visual effects to make this summary appealing to the reader.

MARKING RUBRIC FOR PART 2

Score	Description
5	Summary answers as many of the questions as possible. Summary is clear and concise, and science is written at the Biology 30-level. Summary is appealing and easy to read and/or view.
4	Summary answers many of the questions. Summary is clear and well written. Summary has some appealing qualities and is easy to read and/or view.
3	Summary answers some of the questions. Summary is somewhat clear and easy to read and/or view.
2	Summary answers very few of the questions. Summary is not easy to read and/or view.
1	Summary does a poor job answering any questions. Summary is difficult to read and/or view.

MODULE 7: LESSON 5 ASSIGNMENT

This Module 7: Lesson 5 Assignment is worth 44 marks. The value of each assignment and each question is stated in the left margin.

(44 marks)

Part 1: Recreating the First Chimera

(12 marks) Complete the “Procedure” and “Analysis” questions from “Thought Lab 18.4: Recreating the First Chimera,” from page 649 of your textbook.

Procedure Question 1:

Procedure Question 2:

Analysis Question 1:

Analysis Question 2:

Analysis Question 3:

a. ______________________________

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b. ______________________________

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Part 2: Bt Corn and Butterflies

D 1. Some genetically modified plants have been surrounded with controversy. Bt corn is a genetically modified organism (GMO) that makes up about 50% of the corn crops grown in Canada. Bt is a naturally occurring soil bacterium called *Bacillus thuringiensis*. This bacterium produces a protein that acts as an insecticide. Scientists isolated this protein from Bt and inserted it into the corn DNA.

The resulting transgenic Bt corn produces the Bt protein insecticide, therefore killing pests feeding on the plant. In 1999, a study from Cornell University showed that monarch caterpillars who fed on milkweed covered in Bt corn pollen grew more slowly and had higher mortality rates. News agencies picked up this story quickly, and many articles and reports resulted. There was much controversy surrounding the results of this study.

(10 marks) Search the Internet for reports on Bt corn and monarch butterflies using search terms such as “genetically modified + Bt corn + genetically modified food + butterflies,” or search “archives + CBC + food” for the clip on genetically modified food. Research the controversy regarding this issue. Collect reports that represent the two sides of the controversy. Prepare your research using a variety of opposing organizations’ websites and points of view.

Prepare your research in a format suitable to submit to your teacher or use the space provided. Also, post your work in the discussion area.

Prepare your research to include the following information:

a. Provide links to at least two websites with opposing views.

b. Discuss the issues raised against the validity of the 1999 study described above. Why did many people not accept the study?

c. Describe the results of any further studies that may have occurred

d. Describe other issues with the use of Bt corn (e.g., nutrition value, or effect on humans and the environment).

e. Discuss the advantages and disadvantages of creating transgenic plants (like Bt corn) that produce their own insecticides versus the use of topically applied (sprayed on) insecticides on crops.

f. Explain your opinion in relation to the use of Bt corn based on the research you have completed.

You must also respond and/or comment on one other classmate's discussion posting to receive full marks for this assignment.

Place a copy of your research in the space provided.

There are more lines on the next page.

MARKING RUBRIC FOR PART 2

Marks	Description
10	Discussion posting is thorough, clear, and detailed. Posting covers all of the information requested, and the opinion given is based on researched information. Opposing websites were linked, and advantages and disadvantages were clearly and fairly discussed. The response to classmate was insightful and appropriate.
8	Discussion posting is clear and detailed. Posting covers the majority of the information requested and the opinion given is based on researched information. Opposing websites were linked, and advantages and disadvantages were clearly discussed. The response to classmate was insightful and appropriate.
6	Discussion posting is clear. Posting covers some of the information requested and the opinion given is based on researched information. Opposing websites were linked, and advantages and disadvantages were somewhat discussed. The response to classmate was appropriate.
4	Discussion posting is difficult to read. Posting covers little of the information requested and the opinion given was not based on researched information. Opposing websites were linked, and advantages and disadvantages were poorly discussed. The response to classmate was appropriate.
2	Discussion posting is difficult to read. Posting covers little of the information requested and the opinion given was not based on researched information. Opposing websites were linked, and advantages and disadvantages were not discussed. The response to classmate was unacceptable.

Part 3—Review Questions

(6 marks) 1. Complete the following table.

Using Transgenic Pigs as Organ Donors	Benefits	Risks
To individual people		
To society		
To the economy		
To other species		
To the environment		

(4 marks) 2. Describe two features that are characteristic of the action of restriction endonucleases. How do these features make restriction endonucleases useful to genetic engineers?

3. A farmer plants a strain of transgenic corn in her fields. The corn carries a recombinant gene that confers resistance to a common herbicide. The next year, a species of weed growing near the cornfields is found to be herbicide-resistant. A study shows that the weed is expressing the recombinant gene. You are a journalist assigned to report on the story.

(2 marks) a. What is the significance of the herbicide-resistant weed?

(10 marks) b. Write two main points that you would expect to hear from each of the following individuals you interview: the farmer; an official from the genetic engineering corporation that created the transgenic corn; the owner of a nearby organic farm; a consumer organization opposed to the development of genetically modified organisms; a genetics researcher.

MODULE 7: LESSON 6 ASSIGNMENT

This Module 7: Lesson 6 Assignment is worth 15 marks. The value of each assignment and each question is stated in the left margin.

(15 marks)

Lesson 6 Assignment: You Are Your Genetic Code

Part 1—Lab 1: DNA Fingerprint Analysis

Record your work from the lab gizmo in the spaces provided.

(1 mark) 1. When organisms look alike, are they always twins?

(1 mark) 2. How can you identify twins?

(1 mark) 3. Which codon controlled eye colour?

(1 mark) 4. Which codon controlled skin colour?

(1 mark) 5. Which codon controlled spots?

(2 marks) 6. Explain how you determined which codon controlled a specific gene.

(1 mark) 7. How is the model used in this simulation of one codon making up the gene for eye colour incorrect?

(1 mark) 8. How could you change this simulation so it more accurately models DNA fingerprint analysis?

(1 mark) 9. Write a conclusion statement that answers the problem presented at the beginning of the lab.

(5 marks)

Part 2

In a paragraph, explain how base sequences in nucleic acids contained in the nucleus, mitochondrion, and chloroplasts give evidence of the relationships among organisms of different species.

There is more room on the next page for your response.

MARKING RUBRIC FOR PART 2

Marks	Description
5	Paragraph is clear, detailed, and well written. A strong understanding of nuclear DNA, mtDNA, and cpDNA differences is obvious. An excellent explanation of how nuclear DNA, mtDNA, and cpDNA can each show relationships between members of the same species and between different species was given.
4	Paragraph is well written and shows an understanding of nuclear DNA, mtDNA, and cpDNA differences. A good explanation of how nuclear DNA, mtDNA, and cpDNA can each show relationships between members of the same species and between different species was given.
3	Paragraph is adequately written and shows some understanding of nuclear DNA, mtDNA, and cpDNA differences. An explanation of how nuclear DNA, mtDNA, and cpDNA can each show relationships between members of the same species and between different species was given.
2	Paragraph is poorly written and shows little understanding of nuclear DNA, mtDNA, and cpDNA differences. An explanation of how nuclear DNA, mtDNA, and cpDNA can each show relationships between members of the same species and between different species was poorly done.
1	Paragraph is poorly written and shows little to no understanding of nuclear DNA, mtDNA, and cpDNA differences. An explanation of how nuclear DNA, mtDNA, and cpDNA can each show relationships between members of the same species and between different species was incomplete.

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